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ABSTRACT

The history of vocational education in the United States from 1860-1930 is seen from a different perspective than that in existing accounts of the rise of mass vocational education. In this perspective, vocational education is defined broadly as encompassing professional training, including training for professions that emerged in that era (such as accounting), and evening and extension classes of colleges and universities. Although most advocates of vocational education in the public schools focused on "industrial" education--education for factory work--the demand for commerce-oriented vocational courses exceeded that for industrial courses. A major role was played by proprietary (profit venture) schools, especially correspondence schools, which enrolled an astounding number of students during this period. The majority of students who took vocational courses between 1890 and 1930 did so not as teenagers in public high schools but as adults who had already commenced their working careers. During this time, however, prominent educators such as John Dewey called for a kind of vocational education relating job skills and underlying sciences, aimed at preparation for a mobile career, and taking place in full-time institutions. Starting in the 1920s and continuing into the 1930s, the model of full-time, school-based vocational training began to replace prior models of evening classes. (103 reference notes) (KC)

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FROM USEFUL KNOWLEDGE TO VOCATIONAL EDUCATION 1860 - 1930

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PREFACE

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This paper departs from existing accounts of the rise of mass vocational education in the United States between 1900 and 1930 in several ways. First, it defines vocational education broadly to encompass professional training, including training for new professions like accountancy, and comprises material on the evening and extension classes of colleges and universities. While most advocates of vocational education in the public schools focused on "industrial" education—education for factory work—the demand for vocational courses oriented toward commerce exceeded that for industrial courses, especially in public schools, colleges, and universities. Second, it emphasizes the role of proprietary (profit-venture) schools, especially correspondence schools, which enrolled an astounding number of students seeking vocational education. Finally, it underscores the preeminence of continuing education in this period. The great majority of Americans who took vocational courses between 1890 and 1930 did not do so as teenagers in public high schools but as young adults who had already commenced their working careers.

Admittedly, this is not the way in which we usually think of vocational education. Our image of vocational education as courses taken in preparation for work by children or adolescents in public schools has been shaped by our association of John Dewey with vocational education. This is exactly the form of vocational education that Dewey envisioned. But, as Dewey himself recognized, he did not have a profound impact on the contours of vocational education in his day.

Yet Dewey never lacked allies. Most public school educators of the Progressive Era and the 1920s, even those who disagreed with Dewey about this or that, thought of vocational education as a school-based preparation for work. Further, this school-based model was sanctioned by several hallowed traditions, including a doctrine that I call Useful Knowledge. The ideal of Useful Knowledge impelled the early land-grant colleges to construct academic programs that blended the theory and practice of agriculture and the "mechanic arts" as a sufficient preparation for entry into work. During the 1870s and 1880s, law and medical schools adopted a version of this approach, embodied in the "case method" that C.C. Langdell introduced at the Harvard Law School. Langdell's goal, and that of medical reformers, was to have university-based professional schools provide a complete preparation for practice, in contrast with the notion that formal professional instruction merely supplemented practice.

The ideals of reformers of legal and medical education like Langdell and Harvard's Charles William Eliot resembled Dewey's conception of vocational education and ultimately would dominate professional training in law, medicine, business, and engineering. But the notion of professional or

vocational education preceding practice encountered ferocious opposition even within universities before 1920 and faced nearly insuperable obstacles in application to public education. Many Americans, unable to afford the opportunity costs of prolonged vocational education, dropped out of school, only to find their educational credentials inadequate for a changing job market. These were the clients of the proprietary schools, which carried few or no opportunity costs; promised immediate, cash-on-the-barrel results; and made no pretense of teaching the theoretical aspects of occupations. Public school educators scraped for a niche in the fast-growing empire of vocational education, but as often as not they found themselves on the margin. What success they had in attracting students to vocational courses in the public schools, finally, they had to the extent that they conformed those courses to the contours already shaped by proprietary schools.

THE TRADITION OF USEFUL KNOWLEDGE

The proposition that public schools contributed to the economic well-being of the nation commanded substantial agreement among nineteenth-century educators. Yet most educators did not identify the economic contribution of education with the teaching of vocational skills. Private pay schools in the eighteenth century had frequently offered practical instruction in bookkeeping, surveying, and navigation, a custom continued in some nineteenth-century academies.[1] But Horace Mann and other public school reformers of the antebellum period linked the economic value of schools primarily to their inculcation of habits of order and thrift.[2] Neither Mann nor many of his contemporaries believed that schools should teach vocational skills. What was often called industrial education had little impact on the public schools before the 1880s, and as late as 1888 only a score of high schools, most of them private, were primarily devoted to trade training. For most of the century, industrial education was associated with the education of deviants and dependents: a foreign visitor eager to witness an industrial school in 1850 would have been taken on a tour of reform schools, schools for mental defectives, or prisons.

The vast majority of nineteenth-century Americans learned their trades on the job rather than in schools. This was true of engineers and lawyers as well as carpenters and plumbers. The greatest single engineering feat accomplished by Americans before 1850, the construction of the Erie Canal (1817-1825), owed nothing to engineering graduates, for there were no engineering

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[1] Carl F. Kaestle, *The Evolution of an Urban School System: New York City, 1750-1850* (Cambridge, Mass., Harvard University Press, 1973), p. 10.

[2] On school reform ideology, see Carl F. Kaestle, *Pillars of the Republic: Common Schools and American Society, 1780-1860* (New York, Hill and Wang, 1983), chap. 5.

colleges. Americans idealized the jack-of-all-trades, the one who could learn any skill under any conditions, just as they celebrated the self-made individual. This attitude was subversive of formal vocational education and of the acquisition of highly refined technical skills. Forced to clear the wilderness and build a society, individual Americans learned to practice several trades rather than a single craft skill. Relatively low levels of urbanization in the seventeenth and eighteenth centuries tended to discourage skilled artisanship and help to explain why guilds, which tied workers to a single craft, never developed in America. During the nineteenth century, the urban population grew more swiftly than the total population, a development that created more opportunities for skilled artisans. But immigrant European artisans, like the German pianoforte maker Heinrich Steinweg (Henry Steinway), met much of this demand.

Not until the 1890s did a movement for mass vocational education start to blossom and this movement did not reach fruition until the decade before the United States entered World War I. Between the founding of the National Society for the Promotion of Industrial Education (NSPIE) in 1906 and the passage of the Smith-Hughes Act in 1917, the nation witnessed intense agitation for national aid to vocational education, but even in this period prominent figures associated with the vocational movement often contrasted the relatively meager American provisions for vocational instruction in the public schools with the greener pastures in Europe. In 1907, Arthur Jones of Columbia University observed that, while a comparatively high proportion of American teenagers enrolled in secondary schools, relatively few were in technical schools.[3]

Paradoxically, although the movement for vocational or technical instruction in the public schools developed slowly in America, many American colleges and universities had long proclaimed vocational objectives. In 1862, fifty-five years before the passage of the Smith-Hughes Act, Congress passed the Morrill Act, which authorized the federal government to distribute public lands to the states "to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life" by "the teaching of such branches of learning as are related to agriculture and the mechanic arts."[4] The Morrill Act charged a segment of American higher education, the land-grant colleges, with a broadly vocational mission. Industrial and agricultural

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[3] Arthur J. Jones, "The Continuation School in the United States," U.S. Department of the Interior, Bureau of Education, *Bulletin, 1907* (Washington, D.C., 1907); 81.

[4] The text of the Morrill Act and subsequent amending acts can be read in Benjamin F. Andrews, "The Land Grant of 1862 and the Land-Grant Colleges," U.S. Department of the Interior, Bureau of Education, *Bulletin, 1918* (Washington, D.C., 1918); 7-10.

education did not begin at the bottom of the American educational ladder and work up; rather, they started at the top and worked down. This reversal of what might seem the logical order introduced a number of strains into American education. It deflected training away from mere job techniques and toward relatively abstract and intellectually demanding forms of technical education. It also created a huge chasm between higher and popular vocational training.

Useful Knowledge and the Morrill Act

None of this was intended by the framers of the Morrill Act, but it has never been entirely clear what they did intend. A phrase like "the liberal and practical education of the industrial classes" was open to a variety of interpretations. Did it mean that land-grant colleges were to teach some subjects associated with liberal education and others that were practical? or subjects that were simultaneously liberal and practical? Justin Morrill, the Vermont Republican senator who first introduced a land-grant college bill in 1857 and who guided the final passage of a slightly different bill in 1862, tended to answer all questions about his bills' purpose with "Yes." I.M. Kandel, who investigated the bills' legislative history, concluded in 1917 that Morrill lacked a clear idea of the kind of institution that he was attempting to father.[5] But Kandel was writing on the eve of the passage of the Smith-Hughes Act and after a period of agitation during which the definition of vocational education had become increasingly narrow and rigid. In contrast, Morrill had inherited the antiquated body of ideas known as Useful Knowledge. Extinct by 1917, the notion of Useful Knowledge flourished in the eighteenth and early nineteenth centuries and bequeathed to the Morrill Act both an impetus and a string of apparent contradictions.

In its heyday, Useful Knowledge consisted of assumptions and assertions threaded together by a belief in progress through applied science. The *Transactions* (1771) of the American Philosophical Society, the oldest and most prestigious learned society in North America, proclaimed:

> Knowledge is of little use, when confined to mere speculation. But when speculative truths are reduced to practice; when theories grounded upon experiments are applied to the common purposes of life; and when by these agriculture is improved, trade enlarged, the arts of living made more easy and comfortable, and, of course, the increase and happiness of mankind promoted; knowledge then becomes really useful.[6]

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[5] Isaac M. Kandel, *Federal Aid for Vocational Education*. Carnegie Foundation for the Advancement of Teaching, *Bulletin no. 10* (New York, 1917); 82.

[6] "Preface," *Transactions of the American Philosophical Society*, 1 (1771); xvii; see also John C. Greene, "Science, Learning, and Utility: Patterns of Organization in the Early American Republic," in Alexandra Oleson and Sanborn C. Brown, *The Pursuit of Knowledge and the Early*

These words underscore the intimate connection between Useful Knowledge and invention. In 1851, Edward Everett, the conservative former governor of Massachusetts, reassured the Middlesex County (Massachusetts) Society of Husbandmen and Manufacturers that

> we live on the verge of new improvements or discoveries equal to any yet made; . . . the quarry and the forest, the soil and the air, the stream and the winds, are full of elemental principles and hidden arts and unseen adaptations to human comfort—they are replete, bursting I might say, with great truths.[7]

In turn, inventions resulted from a careful attention to nature and from the systematic study of science. With unflinching self-assurance, promoters of Useful Knowledge combed biographies for evidence that scientific understanding, rather than some mixture of luck and genius, stimulated inventions. For example, Thomas Dick, a British clergyman whose *On the Improvement of Society by the Diffusion of Knowledge* (1833) attracted a wide following in America, tried to show that Richard Arkwright owed his invention of the spinning jenny to his study of the principles of mechanics.[8] Similarly, Everett's oft-delivered lecture on "The Boyhood and Youth of Franklin" proclaimed that Franklin's inventiveness resulted from his persevering study of science rather than from genius or luck. Franklin, Arkwright, James Watt, John Fitch, and Oliver Evans, all self-instructed mechanic/inventors, made up the pantheon of Useful Knowledge.

Mainly the property of elite learned societies in the eighteenth century, Useful Knowledge became a popular cause in the antebellum period and formed the intellectual basis of the mechanics' institutes, the mutual-improvement societies for artisans. Useful Knowledge also became the foundation for various "farm schools" and "people's colleges" established in the 1840s and 1850s to bring science to artisans and farmers.

By the 1830s, evidence that conflicted with the underlying assumptions of Useful Knowledge was mounting. Scientific terminology was fast becoming inaccessible even to educated laymen. In 1848, serious cultivators of science—increasingly called "scientists"—including

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American Republic (Baltimore, Johns Hopkins University Press, 1976), pp. 1-20.

[7] Edward Everett, "The Husbandman, Mechanic, and Manufacturer," in *Orations and Speeches on Various Occasions*, (4 vols. Boston, American Stationers' Co., 1870), 3: 89.

[8] New York, 1833.

Alexander Dallas Bache and Joseph Henry, formed the American Association for the Advancement of Science, a professional society devoted primarily to encouraging the specialized study of scientific branches rather than the popularization of science. During the same period, the spread of factories in New York City, Newark, and Philadelphia was eroding the position of some self-employed artisans. Yet the ideal of the mechanic/inventor instructed in scientific principles continued to arouse allegiance, mainly because it cohered with the image that Americans held of their nation as a republic free of the class inequalities and consequent political oppression of the Old World. Publicizing the image of the mechanic/inventor became a retort to critics of the factory system. Proponents of industrialization and tariff protection contended that factory operatives in America would form a mobile class in perpetual flow and counter-flow between farm and mill, while mechanic/inventors would contribute to increased productivity and national wealth.[9]

The image of the mechanic/inventor promised a benign form of economic development, and thus exerted a potent and tenacious attraction for conservative protectionists and for workers themselves. Especially in the late 1820s and early 1830s, leaders of the workingmen's movement championed education and self-improvement. As the divisions of the so-called second party system (Whigs versus Democrats) sharpened in the mid-1830s, political issues increasingly distracted the workers' leaders from the cause of self-improvement, a tendency exacerbated by the Panic of 1837 and subsequent depression. When economic conditions deteriorated in the early 1840s, most workers turned to movements like land reform, westward expansion, and Manifest Destiny; a minority of contemplative artisans, however, joined middle-class reformers in calling for educational solutions to the plight of labor. In New York, for example, Harrison Howard, an idealistic carriagemaker, helped to inspire the People's College, which opened in an upstate village in 1860.[10] In the West, Jonathan Baldwin Turner was a Yale graduate who acidly criticized liberal arts colleges for turning out knaves and thieves disguised as lawyers and speculators. Turner campaigned successfully in the early 1850s for an "industrial university" that became the University of Illinois.[11]

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[9] Berenice Fisher, *Industrial Education: American Ideals and Institutions* (Madison, University of Wisconsin Press, 1967), p. 5.

[10] Walter P. Rogers, "The People's College Movement in New York State," *New York History*, 26 (October, 1945), 415-455.

[11] Edmund J. James, *The Origin of the Land Grant Act of 1862*. University of Illinois: University Studies, IV, no. 1 (Urbana, November, 1910), p. 5.

Howard and Turner kept aglow the torch of Useful Knowledge and the association between popular and higher education that characterized Useful Knowledge. For example, Howard's vision of the appropriate curriculum for a people's college included "Natural Philosophy, Chemistry, Geometry, Architecture, Drawing, etc., not neglecting any other branches which are taught in our best colleges and universities."[12] No more prone than their predecessors to accept a permanent class of factory operatives as a necessary product of industrialization, Howard and Turner hoped to restore dignity to manual work. Trade training alone would never elevate manual labor; the best interests of workers could be served by giving them the same opportunity for advanced education that lawyers had long enjoyed.

The Morrill Act owed a good deal to Turner's ideas and to the model of his Illinois Industrial University.[13] Although nothing in the act stipulated that the recipients of land grants had to be state-supported institutions, the law did require that land grants be routed to colleges rather than to common schools or high schools.[14] Yet, ironically, it was the Morrill Act, the major legislative success of Useful Knowledge, that brought to the surface the latter's ambiguities. Its assertion of an intimate relation between science and the crafts was more an ideological stance than a prescription for a curriculum. The introduction of manual labor requirements in the land-grant colleges, foreshadowed by similar requirements in the People's College, merely underscored the anomalous blend of science and practical work that characterized these institutions. The wordy encomium that a journalist delivered at the opening of the People's College unintentionally emphasized the anomaly:

> In this institution the student will not only read the lofty verse of Vergil's Georgics, but will reduce his rules to practice while following the 'trailing-footed' oxen spoken of by Homer. The Differential and Integral Calculus will commingle with the ring of the anvil and the whir of the machine shop. The mechanic'' toil will be diversified by the Histories of Tacitus or the eloquence of Cicero and Demosthenes. The elevation which mental training and intellectual power confers will be somewhat lessened by being blended with the

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[12] Earle Ross, *Democracy's College: The Land Grant Movement in the Formative Stage* (Ames, Iowa State College Press, 1942) p. 21.

[13] James, *The Origin of the Land Grant Act*, passim.

[14] Two states, Indiana and Missouri, attempted unsuccessfully to divert the Morrill endowment to their common school funds; see Ross, *Democracy's College*, p. 73.

more common and ordinary industrial occupations of everyday life, while the physical man will be correspondingly elevated, refined and ennobled.[15]

As heirs to Useful Knowledge, the land-grant colleges experienced similar difficulties in reconciling the different threads of their mission. For example, Florida State University appointed a professor of agriculture, horticulture, and Greek.[16] Land-grant colleges long required their students to supplement their classroom instruction with work on university farms or in university shops. Unlike John Dewey's later attempt to use experience as the basis of knowledge, study and work in the land-grant colleges tended to be unrelated to each other. These colleges kept their manual labor requirements in order to maintain their identity as people's colleges where the children of farmers and mechanics would not be embarrassed by calloused hands and rough manners.

Yet land-grant colleges failed to become popular institutions. This failure was most evident in their agricultural departments. Paralleling mechanical invention, agricultural improvement long had been an objective of advocates of Useful Knowledge, and during the 1850s, interest in scientific agriculture intensified both in Europe and America. Morrill himself thought that research into agriculture would become a major function of the land-grant institutions.[17] But once the latter had sprung into existence, students displayed little interest in agriculture courses. To take one of many illustrations, the University of Mississippi—the recipient of the Morrill Act endowment in that state—introduced an agricultural science course in the early 1870s, but only a handful of students enrolled. Partly in response to the failure of the University of Mississippi to attract students into agriculture, the state legislature chartered the Agricultural and Mechanical College of Mississippi in 1878. But little changed. Students continued to avoid agricultural courses. Especially embarrassing to the new institution was the fact that the son of its president enrolled upon graduation in the Harvard Law School.[18]

The mechanic arts fared better in the land-grant colleges. In contrast to agricultural science, still in the formative stage in the 1870s as an academic subject, the mechanic arts could be related

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[15] Quoted in ibid., pp. 26-27.

[16] Ibid., p. 87.

[17] Kandel, *Federal Aid for Vocational Education*, pp. 4-5.

[18] John K. Bettersworth, *People's College: The Centennial History of Mississippi State* (Jackson, University Press of Mississippi, 1980), pp. 11, 153.

to an academically well-developed discipline—engineering. Engineering departments became the core of most land-grant institutions and easily outdrew their agricultural counterparts. But engineering triumphed in a form that distanced it from Useful Knowledge. In the 1870s and 1880s conflicts broke out within several engineering colleges, including those in the land-grant universities, between advocates of shop-based instruction, which stressed application to practice, and proponents of higher mathematics and the sciences. When the dust settled, supporters of a curriculum based on mathematics and science controlled most American engineering colleges. At Cornell, for example, Robert Thurston, whose background lay in the engineering corps of the Navy rather than in shop work, reorganized the curriculum toward the sciences in the 1880s and successfully scuttled a provision to allow credit toward entrance into the engineering school, the Sibley College of the Mechanic Arts, for shop experience.[19]

Cornell's resistance to extreme practicality became the characteristic response to the demands for science and utility that arose after the Civil War. These demands, which affected traditional Harvard as well as upstart Cornell, were in keeping with the old idea that universities existed to train leaders rather than workers. Cornell's president Andrew Dickson White quietly interred Ezra Cornell's call for university-connected factories that would teach students to become self-supporting. Harvard's Charles William Eliot, a zealous proponent of science and electives, dampened any notion that Harvard educate practical workers. At Johns Hopkins, Daniel Coit Gilman pursued a similar course; while endorsing technology and trade schools, Gilman saw to it that Hopkins became a research-oriented institution. These and other forward-looking presidents of the Gilded Age proved adept at aligning themselves with the new stress on science and utility without turning their institutions into trade schools. They did so by enhancing the scientific component of the university curriculum, while simultaneously campaigning for an elaborate, differentiated, and hierarchical system of lower schools to produce middle-level technicians and ordinary mechanics.[20]

The equation of the mechanic arts with academic engineering and the deflection away from universities of demands for utility did not go unchallenged. Throughout the 1870s and 1880s, critics contended that engineering colleges were turning out over-educated academic wizards who

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[19] Monte A. Calvert, *The Mechanical Engineer in America, 1830-1910: Professional Cultures in Conflict* (Baltimore, Johns Hopkins University Press, 1967), pp. 45-46, 97, 103.

[20] Fisher, *Industrial Education*, pp. 53-55; Laurence R. Veysey, *The Emergence of the American University* (Chicago, University of Chicago Press, 1965), pp. 70-73.

were unfamiliar with tools and practical problem-solving. Massachusetts's Worcester Free Institute (1868) became a model for these critics, for its students attended engineering courses and also sold articles they made in the institute's shops. But Worcester Free inspired more curiosity than emulation on the part of engineering professors elsewhere. Most engineering professors in late-nineteenth-century colleges and universities sought to erect their discipline on a firm academic foundation and to develop specialties that reflected new industrial technology. By 1914, a student of mechanical engineering at the Massachusetts Institute of Technology had to take heat engineering, boiler design, electrical engineering, machine design, hydraulics, power-plant design, refrigeration, factory construction, and heating and ventilation. Not surprisingly, a Carnegie Foundation study in 1918 found the engineering curriculum at M.I.T. and other engineering colleges "congested beyond endurance."[21]

MANUAL TRAINING

In this context, critics of engineering colleges increasingly looked to primary and secondary education, and specifically to "manual training," to salvage the ideal of blending theory and practice, science and experience. One of the earliest and most articulate proponents of manual training, Calvin Woodward of Washington University's Polytechnic School, came to recognize in the 1870s that many of his students could not handle tools. He responded by introducing compulsory shop instruction and by promoting the establishment of a manual training high school. His plans bore fruit in 1880 with the opening of the St. Louis Manual Training School, the first shop-oriented technical preparatory school in the nation.[22]

In contrast to the Worcester Free Institute, which sought to train engineers who could use their hands, the St. Louis Manual Training High School meant to establish shop work as an integral component of general, or liberal, education. An admirer of Ralph Waldo Emerson, Woodward quoted Emerson's complaint that most schools and colleges condemned their students for ten to fifteen years to memorize words, and then sent forth graduates who "do not know a thing." The school's motto, The Cultured Mind, the Skillful Hand, stated Woodward's belief in Useful Knowledge, specifically in the notion that education could achieve liberal and practical goals

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[21] Charles R. Mann, *A Study of Engineering Education*. Carnegie Foundation for the Advancement of Teaching, Bulletin #10 (New York, 1918): 24; 22-23.

[22] Calvin M. Woodward, *The Manual Training School* (New York, Arno Press, 1969), pp. 3-5.

simultaneously. It made no sense, he argued, to study physics and chemistry without the experience of touching objects and without firsthand experience of mechanical processes.[23]

Woodward echoed the longstanding tenet of Useful Knowledge that "the good workman is much less frequently reduced to want than those who live by their wits."[24] Justin Morrill had praised farmers in much the same terms: "They do not produce, vend or consume luxuries. They hasten slowly, and go untouched by all epidemical speculations."[25] In the eyes of both men, manual workers formed a saving remnant in a nation where "the distant possibilities of affluence through speculation or the shrewd management of the labor of others, the large salary or the enormous fee of the occasional professional man draw the infatuated crowd as the song of the fabled siren did the voyagers of old."[26] As these comments indicate, moralism permeated the manual training movement. Woodward insisted that manual training's purpose "is not to make mechanics." Rather, the movement would restore respect for manual work and dampen the "ambition to be rich," that ignoble propensity that turned the heads of middle-class, native-born young people away from the manual trades and toward professional and mercantile careers.[27]

In Woodward's view, the popular desire for easy money was not the sole threat, for trade unions exerted a "tyranny" over the workplace. Although a negligible component of Useful Knowledge, hostility toward unions became a prominent feature of the manual training movement. Advocates of manual training claimed that the unions deliberately restricted the supply of apprentices and thus denied young people the opportunity to acquire skill on the job. In fact, the issue of apprenticeship was more complex than Woodward, for one, allowed. Unions restricted apprenticeship because they feared that the continued advance of machinery would turn apprentices into unskilled child laborers. A surplus of juvenile workers would drive down the wages of adult mechanics. By the 1870s, apprenticeship had become little more than a euphemism for child labor in many industries. Data compiled in the 1870s by Carroll Wright, Massachusetts's pioneering commissioner of labor statistics, indicated that teenagers formed a very high proportion of workers

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[23] Ibid., p. 76.

[24] Ibid., p. 267.

[25] Quoted in Kandel, *Federal Aid for Vocational Education*, p. 5.

[26] Woodward, *The Manual Training School*, p. 267.

[27] Ibid.

in factories and a low proportion in the crafts. Artisans who feared that they would become the next victims of machinery had every reason to restrict the number of craft apprentices.[28]

Manual training paid little attention to the challenge posed by the introduction of machines. The dozen or so manual training high schools established in the 1870s and 1880s were craft-oriented rather than factory-oriented. They focused on carpentry, cabinetmaking, blacksmithing, brick making, and masonry, rather than on machine repair, electrical wiring, and the mechanics of the air brake.[29] This bias toward the traditional crafts was practical as well as ideological, for changes in industrial technology were occurring too swiftly to be absorbed by schools. Few manual training instructors knew how to repair a typewriter or a Bonsack cigarette machine, a handful of which could glut the market with cigarettes, and saw no point in teaching young people how to tend new machines.

The craft-orientation of manual training reached its extremes in primary education. In 1887 Woodward declared that, for the first time, the vast membership of the National Education Association was genuinely sympathetic to manual training.[30] Motivated by the thought that urban children knew nothing of natural processes, educators in the 1880s experimented with ways to introduce simplified forms of manual training into kindergartens and elementary schools. A system of woodworking called sloyd enjoyed immense popularity among public school educators. Devised originally in Finland and widely employed throughout Scandinavia as a way to train the younger generation to respect the handicraft traditions of peasant life, sloyd emphasized the fabrication of

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[28] Joseph F. Kett, *Rites of Passage: Adolescence in America, 1790-Present* (New York, Basic Books, 1977), pp. 146-47.

[29] Jones, "The Continuation School," p. 96; U.S. Department of the Interior, Bureau of Education, *Report of the Commissioner of Education, 1887-1888* (Washington, D.C., 1889), pp. 923-24. Despite their craft orientation, the manual training high schools established in the Gilded Age do not appear to have produced very many craftsmen. Woodward's own study of the occupations of graduates of the St. Louis Manual Training High School disclosed that 153 became bookkeepers; 100, merchants or manufacturers; 75, engineers; 44, salesmen or agents; 41, teachers; and 39, lawyers. See Woodward, *The Manual Training School*, p. 223. Aside from the relatively large number of graduates who became engineers, this distribution did not differ notably from that of most high schools in the Gilded Age. Michael Sedlack's study of graduates of the Chicago Manual Training School (private communication to author) revealed a similar pattern. Sedlack notes that an institution founded to train machinists and draftsmen was employed by middle-class and higher working-class families to launch their sons on professional career trajectories.

[30] Lewis F. Anderson, *History of Manual and Industrial School Education* (New York, D. Appleton and Co., 1926), p. 176.

useful and beautiful objects out of wood. Boston's John Ordway, who is credited with bringing sloyd to the attention of American educators, insisted that the knife was "the first fundamental tool."[31] Ordway's choice of words revealed sloyd's association with traditional handicraft and the disposition of its backers to dogmatize a series of stages through which all children passed. Like Froebelianism, another enthusiasm of nineteenth-century educators, sloyd demanded minute observance of a sequence of developmental stages.

Although never divorced from economic objectives, manual training espoused essentially educational and cultural aims. For the advocates of sloyd, workers were inappropriate teachers, for only professional educators could be counted on to follow the system's precise and rigid sequence of exercises. Not surprisingly, by 1900 manual training had acquired an unfortunate reputation among proponents of vocational education.

In sum, by the 1880s, engineering had absorbed the mechanic arts within higher education, while manual training on the primary and secondary level usually ignored industrial processes.

TECHNICAL INSTITUTES

During the second half of the nineteenth century, a small number of technical institutes sprouted between the cracks of American education. Neither engineering colleges nor manual training schools, the technical institutes included the Pratt Institute (1877), the Polytechnic Institute of Brooklyn (1855), the evening school of Cooper Union (1859), the Drexel Institute (1891), and the Carnegie Technical Schools of Pittsburgh (1905). To this list one might add the Ohio Mechanics Institute, which originated as a mutual improvement society for artisans then gradually evolved into a technical institute, and the Springfield (Massachusetts) Evening School of Trades (1872). In contrast to engineering colleges, technical institutes offered one- or two-year courses that did not lead to degrees. Whether they were day or evening schools, the technical institutes functioned essentially as continuation schools: the great majority of their students had previous work experience.[32] For example, in 1902 the average age of students in the Springfield school was 23.7, and half of its students were over 24.[33] Similarly, most of the teachers in technical institutes

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[31] Ibid., pp. 186, 85-91.

[32] William E. Wickenden, *A Study of Technical Institutes* (Lancaster, Pa., Lancaster Press, 1931), pp. 1-47.

[33] Jones, "The Continuation School," p. 96.

had industrial experience, whereas those in the manual training high schools did not. Finally, unlike the engineering colleges, which presented students with a vast range of subjects, technical institutes focused on upgrading skills that individual students already possessed.

Technical institutes had little difficulty finding a niche for themselves. Throughout the late nineteenth and early twentieth centuries employers often complained that the graduates of engineering colleges were overqualified for the jobs available. In the 1920s, several surveys indicated that the demand of manufacturers for employees with two years of postsecondary education and with specific technical skills exceeded the demand for graduates for four-year colleges of engineering by a factor of between two and three.[34]

Nevertheless, the number of technical institutes grew much more slowly than that of engineering colleges. In 1930 there were thirty-seven technical institutes in the United States, compared to 150 engineering colleges; in that year, the technical institutes graduated 1,500 students, compared to 9,000 engineering-college graduates.[35] Additionally, technical institutes tended to become engineering colleges. The day schools of the Drexel Institute, for example, began to grant degrees in 1915. The Armour Institute in Chicago, which started in 1893 with both vocational and collegiate departments, gradually discontinued the former. The Carnegie Technical Schools of Pittsburgh, which originally included a School of Applied Science, a School for Apprentices and Journeymen, a School of Applied Design, and a Vocational School for Women, were reorganized in 1915 into the Carnegie Institute of Technology, a degree-granting college.[36]

Although demand for the services of their graduates exceeded the supply, technical institutes never occupied more than a peripheral position in American education. Part of the reason for their marginality lay in the well-entrenched position of four-year colleges. In the 1850s, just before the boom in engineering colleges, there were over two hundred colleges in the United States.[37] The proliferation of colleges in antebellum America made it easy for Americans to conclude that engineering education could be annexed to colleges or universities. In contrast, in Britain, with its

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[34] Wickenden, *A Study of Technical Institutes*, pp. 49-71.

[35] Ibid., pp. 36-37.

[36] Ibid.

[37] Colin B. Burke, *American Collegiate Populations: A Test of the Traditional View* (New York, New York University Press, 1982), pp. 16-17.

handful of universities in 1850, technical institutes rather than universities dominated engineering education in the late nineteenth century. In 1897, of the nearly 400,000 students attending Britain's technical institutes, close to 300,000 attended in the evening.[38]

It was not only the preponderant college model that reduced the technical institutes, with their stress on practical experience, to a subordinate status in the United States. Between 1870 and 1890, American industry developed in ways that accorded higher prestige to broadly-trained college graduates—either in engineering or the liberal arts—than to technicians with job-specific skills.

THE RISE OF CORPORATE MANAGEMENT

An unprecedented emphasis on the management of industrial processes characterized American economic development after 1870. Favored by an ever-expanding home market, American corporations introduced high-speed machinery in the 1870s and 1880s in the manufacture of matches, cigarettes, and soap; in the refining of oil and the milling of flour; and in the fabrication of a wide range of metal products. Whereas in Europe skilled machinists made company's product, their American counterparts were more likely to design or set up semiautomatic machines for less-skilled workers to operate.[39] In addition, American corporations were distinguished by their integration of production and marketing functions and by marketing innovations like chain stores and mail-order houses.[40] All of these developments increased the demand for workers who could direct other workers. One study revealed that the number of supervisors, administrators, and technical experts rose, as a percentage of all gainfully-employed workers, from 1.25 in 1870 to 1.40 in 1880; 1.74 in 1890; 2.46 in 1900; 3.27 in 1910; and 3.60 in 1920.[41]

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[38] Roderick C. Floud, "Technical Education and Economic Performance: Britain, 1850-1914," *Albion* 14 (1982): 153-71.

[39] Robert R. Locke, *The End of the Practical Man: Higher Education and the Institutionalization of Entrepreneurial Performance in Germany, France, and Great Britain—1880-1940* (Greenwich, Conn., JAI Press, 1984), chap. 3.

[40] Alfred D. Chandler, *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass., Harvard University Press, 1977), pp. 209-39.

[41] National Industrial Conference Board, *Engineering Education and American Industry*. Special Report no. 25, n.p., 1923, p. 7.

Revolutions in distribution and production encouraged new approaches to management. Scientific factory management first appeared in the metal-making industries. Factory owners devised elaborate systems of routing materials in order to ensure the steady flow of raw materials to workers. At first left to foremen and workers, the responsibility for routing was later shifted to a separate class of clerks and timekeepers. In order to induce workers to accept the new procedures for coordinating production, manufacturers devised incentive systems, usually systems for sharing with foremen and workers the profits resulting from more effective scheduling and the fuller use of machinery and plant.[42]

Taylorism

Frederick Winslow Taylor, generally considered the father of scientific management, took part in the early discussions of factory management in the 1880s. By 1895, when Taylor delivered his first paper on what soon became known as scientific management, he had become a critic of existing profit-sharing plans.[43] Taylor identified two defects in the prevailing approach to factory management. First, existing plans to reward workers for accelerated output were based on past experience, or a "usual" rate of production. Taylor maintained that the usual rate of work reflected not what a single worker was capable of achieving but what the group of workers would allow. He refused to accept the usual rate as scientific, insisting instead that a standard of time for any task could be calculated by time-and-motion studies. As Daniel Bell has noted, Taylor tried to construct a kind of social physics: "once work was scientifically plotted, Taylor felt, there could be no dispute about how hard one should work or the pay one should receive for labor."[44] Secondly, Taylor concluded that an effective system of management would not only reward workers who exceeded the standard, but also punish the ones who came up short, by paying them a lower rate per piece (the "differential piece rate").

As immense as Taylor's influence was, Taylorism neither impelled nor primarily guided the growth of management. Given their preoccupation with industrial processes and the integration of

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[42] Chandler, *Visible Hand*, pp. 272-75.

[43] Samuel Haber, *Efficiency and Uplift: Scientific Management in the Progressive Era, 1890-1920* (Chicago, University of Chicago Press, 1973) chap. 1; Daniel Nelson, *Frederick W. Taylor and the Rise of Scientific Management* (Madison, University of Wisconsin Press, 1980), chaps. 2 and 3.

[44] Daniel Bell, "Work in the Life of America," in William Haber, et al., *Manpower in the United States: Problems and Policies* (New York, Harper and Row, 1954), p. 6.

functions, American corporations became "manager-intensive" of necessity. Indeed, Taylorism proved irrelevant to many of the decisions that managers had to make. Output reflected more than the smooth organization of work on the factory floor. It also depended on sales forecasts, marketing analyses, and decisions about financing (whether to borrow, sell shares, or reinvest profits).[45] Taylorism provided no guidance on these issues. Corporations wanted managers who could think broadly and flexibly, and by the 1890s they were increasingly turning toward colleges and universities for managerial recruits.

The New Managers

Not all corporations rushed to hire graduates—Henry Ford, for example, preferred to recruit his executives from the ranks of machine-shop technicians. Nevertheless, the trend toward hiring graduates for managerial positions, evident in the 1890s, accelerated between 1900 and 1930.[46] To tap the business vein, many universities and colleges opened schools or departments of business. There were seven such subdivisions in 1900. Business departments or schools were established in 25 institutions of higher education between 1900 and 1913; in 37 between 1914 and 1918; and in 117 between 1919 and 1924, a period marked by a "veritable craze" for higher business education.[47] Engineering graduates also veered into business. A survey conducted in the early 1920s by the National Industrial Conference Board disclosed that, twenty-five years after graduation, more than half of the graduates of selected engineering schools were no longer employed as engineers. The authors of the survey surmised that the intimate relationship between engineering, especially mechanical engineering, and "factory industry" induced many graduates to enter management.[48]

The Shape of Higher Professional and Vocational Education

Whether warranted or not, the belief that college graduates possessed the ability to think broadly and to adapt to changing circumstances contributed to the expanding market for graduates

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[45] Chandler, *Visible Hand*, p. 486; Locke, *End of the Practical Man*, pp. 93-95.

[46] Irvin G. Wyllie, *The Self-Made Man in America: The Myth of Rags to Riches* (New Brunswick, N.J., Rutgers University Press, 1954), p. 108; David O. Levine, *The American College and the Culture of Aspirations, 1915-1940* (Ithaca, Cornell University Press, 1986), chap. 3.

[47] James H. Bossard and J. Frederic Dewhurst, *University Education for Business: A Study of Existing Needs and Practices* (Philadelphia, University of Pennsylvania Press, 1932), p. 253.

[48] *Engineering Education and American Industry*, pp. 15-16; L.C. Marshall, ed., *The Collegiate School of Business: Its Status at the Close of the First Quarter of the Twentieth Century* (Chicago, University of Chicago Press, 1928), p. 405.

in the world of corporate enterprise. For their part, colleges and universities reformed their curricula so as to encourage flexible and adaptive modes of thought. The initial impulse behind this reform arose in law. In 1870 Dean C.C. Langdell introduced the "case method" at the Harvard Law School. Langdell contended that law was a science, to be investigated by the analysis of appellate decisions. This investigation would yield principles of law, much as laboratory experiments revealed principles of physical motion or chemical reactions. The case method, which subordinated mastery of precedents and statutes to analysis, purported to inculcate a mode of thinking, rather than a body of knowledge, and it quickly became the darling of professors at elite, nationally-recognized law schools, those that in 1900 formed the American Association of Law Schools (AALS). Where apprentices in law offices—the traditional centers of legal education—learned how to draft documents and mastered statutes and precedents peculiar to their local jurisdictions, law graduates were expected tto master principles applicable to any number of jurisdictions. By the second decade of the twentieth century the case method had become the standard at leading university law schools.[49]

Corporation law proved an extremely attractive field for the graduates of nationally-recognized law schools, the schools most likely to adopt the case method. University schools and departments of business (hereafter collegiate business schools) also moved toward the case method, but much more slowly than law schools. The claims of business as a subject of higher education were cloudier than those of law, which had long been established as a learned profession. The notion of higher education in business struck many late-nineteenth-century educators and business people as an oxymoron. The seven collegiate business schools that existed in 1900 struggled to define their mission and identity. They did so by restricting instruction in bookkeeping and other "mere arts of the counting room" and by attempting instruction in a daunting range of business and cultural activities. The four-year curriculum of the Wharton School of Finance and Economy (1881) included subjects like English literature; logic; ethics; Roman history; the constitutional histories of Germany, Switzerland, and England; sociology; and the art of newspaper making. The University of California's business school outdid Wharton's list of fifty-two courses by offering specialties like "economic botany," wild-animal products, fisheries, mining and mineral products, and the decorative arts, as well as "the history of commerce in all countries and in every age."[50]

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[49] Robert B. Stevens, *Law School: Legal Education in America from the 1850s to the 1980s* (Chapel Hill, University of North Carolina Press, 1983), pp. 177; 187, note 54; 186-87, note 53.

[50] Edmund J. James, "Commercial Education," in Nichols M. Butler, ed., *Monographs on Education in the United States* (Albany, N.Y., J.B. Lyon Co., 1904), pp. 38-39; 44-45.

Collegiate business schools did not even begin to adopt the case method until the 1920s. In the late nineteenth century, Edmund J. James and other proponents of higher business education sought to erect the new academic discipline on the foundation of a broad liberal education. Their efforts to distinguish higher business education from the "mere arts of the counting room" succeeded, but at a price. By embracing the model of full-time sequential education as a prelude to practice, the collegiate business schools of the late nineteenth century severely restricted their growth. Only 528 students enrolled in the Wharton school between 1892 and 1898 and, as noted, only seven collegiate business schools were established before 1900. Yet many Americans continued to view higher education for the professions as a talisman that would open any door; after 1900, colleges and universities invented ways to popularize higher vocational instruction in law and business, most notably through evening colleges.

The Rise of the Evening College

The first decades of the twentieth century marked the golden age of the evening colleges, especially in business and law. Many of the collegiate business schools established between 1900 and 1920 offered classes only in the evening. This was true, for example, of New York University's School of Commerce, Accounts, and Finance and of Northwestern University's School of Commerce. By 1917/1918 five urban universities—the universities of Pittsburgh and Cincinnati, Boston University, NYU, and Northwestern (whose school of commerce was located in downtown Chicago)—enrolled five thousand evening commerce students.[31] The evening schools of some of these universities were their largest subdivisions, typically much larger than their day colleges of liberal arts.

The rise of evening business colleges was closely tied to the development of accountancy as an academic subject. Accountancy, a by-product of the industrial revolution, was especially relevant to the corporate revolution. Unlike traditional bookkeepers, who recorded the profit or loss from each sale, accountants tackled the daunting task of assessing and classifying the costs of industrialists, who purchased items that they did not sell and carried fixed costs that defied traditional, double-entry bookkeeping.[32] The revolution in management that accompanied industrial growth between 1870 and 1900 stimulated interest in cost accounting, as well as in other forms of

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[31] Department of the Interior, Bureau of Education *Biennial Survey of Education, 1916-1918*, 4 vols. (Washington, D.C., 1919) 3: 806, 814.

[32] A.C. Littleton, *Accounting Evolution to 1900* (New York, 1966), chap. 21.

accounting made necessary by the increasing sophistication of financial institutions. Accountants were bent on distinguishing themselves from the world's Bob Cratchits, "mere bookkeepers," and insisted that they be accorded professional status. Starting in New York in 1896, one state after another began to regulate entry into the new profession of "certified" public accountancy by means of examinations and licensing procedures. These regulations, in turn, propelled the growth of evening business colleges. For example, New York State entrusted the administration of its accountancy examinations to New York University, whose commerce school functioned mainly to prepare students for the state's accountancy examination.[53]

One of the axioms that floated around the business colleges in the early 1900s was that those who knew accountancy could not teach it and those who could teach it did not know it. Most accountancy teachers were moonlighting CPAs with at best dim notions of pedagogy, while the students typically were young working adults in their mid-to-late twenties trying to qualify for the new profession of accountancy.[54] Neither students nor teachers conformed to the ideal image that commerce deans had for their schools. Charles Waldo Haskins, dean of New York University's School of Commerce, Accounts, and Finance, was, until his death in 1903, one of the most prominent of the business educators. He maintained that "it will be conceded without argument that banking education has in mind the training for a calling or profession of men who are not yet prepared to engage actively in work."[55] In reality, whether they studied banking, accountancy, or insurance, virtually all of those enrolled in the school Haskins headed already held jobs.

Legal education also came to rely heavily on evening colleges. In 1889/1890 the nation's nine night law schools had only 403 students, a third of the number (1,192 students) attending the six full-time law schools. Both the number of law students and the ratio of part-time to full-time

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[53] Jeremiah Lockwood, "Early University Education in Accountancy," *Accounting Review* 13 (June, 1938); 141.

[54] Ibid., pp. 142-143.

[55] Charles W. Haskins, *Business Education and Accountancy* (ed. by Frederick A. Cleveland, New York, Harper and Brothers, 1904), pp. 59-60.

students changed dramatically in the next four decades. By 1926, there were forty-five thousand law students, and of these nearly 60 percent attended part-time, most of them only in the evening.[56]

The history of these evening law schools reveals a great deal about the forces that were impelling professional education in the early 1900s. Evening law students enrolled either in "mixed" schools—schools that offered both day and evening classes—or in exclusively evening schools. Many of the mixed type of law schools were affiliated with universities, but the evening-only variety were usually proprietary ventures, that is, fee-financed schools owned by their professors. Some of these began as outgrowths of classes in business law offered by proprietary business schools or the Y.M.C.A. Others started as cram schools for the bar examinations.[57] Still others reflected the ambitions of individual practitioners to build local reputations. Neither the American Bar Association nor the American Association of Law Schools could halt the spread of these schools, mainly because sympathetic state legislatures kept chartering them, empowering them to grant degrees.

In many ways, the evening law schools were genuine "people's colleges." They gave working adults, often immigrants or the children or immigrants, an opportunity to qualify for a learned profession. Vote-conscious legislators were disinclined to shut them down. For example, in 1907, Gleason Archer, a student at Boston University's law school, started an evening law school. Typically, one of his first students, a Norwegian house painter with a marginal command of English, asked Archer, "Can you learn me anything?" After achieving some initial success, Archer began a campaign in 1909 to obtain a charter from the Massachusetts legislature. Although Archer vociferated about opposition from a Harvard-led "educational octopus" that sought to frustrate him at every turn, he conceded that his real opposition came from a rival evening school, the Y.M.C.A.'s law school in Boston (later the law school of Northeastern University), and not from Harvard gentry. The Y.M.C.A. school had already secured degree-granting power and looked upon Archer as an unwelcome rival. Benefitting from a Democratic party sweep in state elections,

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[56] Alfred Z. Reed, *Present-Day Law Schools in the United States and Canada*. Carnegie Foundation for the Advancement of Teaching, Bulletin no. 21 (New York, 1928); 121; 120.

[57] Ibid., pp. 98-99, note 2.

Archer finally won his charter in 1914. Enrollment in what was now the Suffolk School of Law immediately increased fivefold.[58]

Yet there were limits to the extent to which the collegiate model could be stretched to meet popular aspirations for higher vocational and professional education. Even in the fields of law and business, where evening colleges sank roots, these institutions faced opposition from professional elites. In the 1920s, collegiate business schools, which had commenced in the 1880s and 1890s on the day track, then switched onto the evening track between 1900 and the 1920s, moved back to day instruction. For example, NYU started an undergraduate day school of commerce in 1912, while Northwestern opened its undergraduate day college on its Evanston campus in 1919.[59] Both institutions continued to offer evening classes. In fact, in the 1920s, Northwestern's evening business school in Chicago attracted ten times as many students as its undergraduate college in Evanston. Nevertheless, the trend was clear. By 1931, a leading authority on business schools could describe the collegiate commercial day course as "the basic development," the "one implied ordinarily" when one spoke of a collegiate school of business.[60] To university presidents and business school deans, the evening colleges were open to the fatal objection that their students never graduated.[61] Indeed, most evening students attended business schools to prepare for the CPA examinations. Deans of the collegiate business schools could not reconcile the realities of evening colleges with the ideal of a professional school as a comprehensive preparation for practice. By the 1930s, evening law schools were in decline, victims of the depression. While the elite law schools more than held their own, the proprietary law schools experienced a drastic slump in enrollments.

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[58] Gleason Archer, *The Educational Octopus: A Fearless Portrayal of Men and Events in the Old Bay State, 1906-1915* (Boston, Privately Printed, 1915), pp. 20, 267.

[59] Michael W. Sedlack and Harold F. Williamson, *The Evolution of Managerial Education: A History of the Northwestern University J.L. Kellogg Graduate School of Management, 1908-1983* (Urbana, University of Illinois Press, 1983), pp. 23, 26, 29.

[60] Bossard and Dewhurst, *University Education for Business*, p. 258.

[61] Collegiate business schools resorted to various ploys to induce their evening students to secure degrees (or reasonable facsimiles). New York University, for example, awarded academic credit for work experience. See Theodore R. Jones, ed., *New York University, 1832-1932* (New York, New York University Press, 1933), p. 369.

As the demand for lawyers shrunk, fewer students were willing to undergo the ordeal of securing law degrees at night.[62]

Extension Education

Even during the golden age of evening colleges, colleges and universities made no effort, or inadequate ones, to satisfy the demand for higher vocational education in a wide range of fields. Evening instruction flourished for a period in business education, because business faculties were insecure and needed the back door to university status that evening colleges provided. In general, the better established a collegiate faculty, the less attention it paid to evening instruction. The medical profession, which raised its standards much more swiftly than did the legal profession, ignored evening instruction and succeeded well before 1930 in driving most of the proprietary schools out of business. Similarly, engineering faculties—in 1900, much better established than business school faculties—paid relatively little attention to engineering extension in the form of off-campus lectures and correspondence courses in the mechanic arts.

One exception was the University of Wisconsin, which originally organized its extension division around engineering. The first director of Wisconsin's extension division, Louis Reber, was a professional engineer whom Wisconsin hired away from Pennsylvania State University's school of engineering. Reber and his colleague William Lighty, who headed Wisconsin's division of correspondence education, forged into the field of engineering extension in the decade before World War I. But they found the engineering faculty of the university slow to follow. Engineering professors were aghast that courses in plumbing and auto mechanics were being offered under the auspices of the university and preferred to concentrate on their own undergraduate students. By 1920, Wisconsin's extension division no longer accorded priority to engineering.[63]

The attitudes of engineering faculties were not the sole factor in turning interest away from engineering extension. By 1920, the land-grant colleges had devised alternative ways to raise their public profiles. First, starting in the mid-1880s, the land-grant institutions commenced experiments

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[62] Stevens, *Law School*, pp. 177; 187, note 54; 186-87, note 53; Joseph T. Tinnelly, *Part-Time Legal Education: A Study of the Problems of Evening Law Schools* (Brooklyn, Foundation Press, 1957), p. 25.

[63] Frederick M. Rosenstreter, *The Boundaries of the Campus: A History of the University of Wisconsin Extension Division, 1885-1945* (Madison, University of Wisconsin Press, 1957), pp. 72-74; B. G. Elliott, "The History and Development of Engineering Extension," *Proceedings of the National University Extension Association, 1923*, p. 80.

with off-campus "farmers' institutes." Lasting up to a week, these institutes consisted of lectures by professors of agronomy conducted for the benefit of local farmers. The institutes quickly became popular and helped the land-grant colleges to deflect criticism for their failure to attract students to their campus courses in agriculture. Indeed, deflecting public criticism was among their chief objectives. The University of Wisconsin, for example, launched its farmers' institutes in the mid-1880s, in direct response to legislative threats to close the agricultural college on the Madison campus and to establish an independent agricultural college.[64]

By 1914, agricultural extension had received an additional boost from the so-called Farmers Cooperative Demonstration Work. Seaman A. Knapp, an employee of the United States Department of Agriculture, began his experiments with demonstrations in Texas in 1902. Knapp contracted with local farmers to allow him to try his methods on a section of their land. All the farmer had to do was to observe the results and adapt Knapp's methods. Knapp had no interest in educating farmers to become agricultural scientists. He claimed not to care whether farmers planted by the cycles of the moon, as long as they tried his methods. A contemporary aptly characterized the demonstration method as "ridiculously simple," a quality that made the land-grant colleges reluctant to embrace demonstration work. Gradually, however, state universities absorbed Knapp's methods into their expanding programs of agricultural extension. In 1914, Congress recognized the popular success of agricultural extension by passing the Smith-Lever Act, which established the Agricultural Extension Service under the joint administration of the land-grant colleges and the United States Department of Agriculture.[65]

Another factor that drew attention away from engineering extension was the crowding of extension courses by teachers in search of degree credits. The dramatic growth of public high school enrollments—from a quarter of a million in 1890 to nearly four million by 1926—created a vast number of new teaching and supervisory positions and sparked a movement to raise the standards of the teaching profession. Teachers felt mounting pressure to obtain degrees, and between 1890 and 1930 most of the nation's normal schools were upgraded from secondary schools

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[64] Roy V. Scott, *The Reluctant Farmer: The Rise of Agricultural Extension to 1914* (Urbana, University of Illinois Press, 1970), pp. 76-92.

[65] Rodney Cline, *The Life and Work of Seaman A. Knapp* (Nashville, Goerge Peabody College of Teachers, 1936); Scott, *Reluctant Farmer*, pp. 206-313.

to teachers' colleges.[66] At the same time, teachers who lacked degrees flocked into summer sessions and extension courses. In 1927, Columbia University's summer session enrolled 13,500 students, a number that exceeded Columbia's enrollment during the regular academic year.[67] Nationally, the number of summer students tripled in the decade after 1917.[68] While not all summer students were teachers, teachers comprised a higher proportion of summer students then than now. Furthermore, by the mid-1920s, teachers also comprised fully 60 percent of the nation's university extension students.[69]

Deluged by teachers in quest of degree credits, extension divisions had little incentive to devise experiments to reach the mass of people through vocational education. Indeed, by 1930, the era of experimentation that saw universities attempt to reach the public through engineering extension courses and through evening business colleges was passing. Agricultural extension had silenced legislative criticism of the land-grant colleges, and the hordes of teachers in summer sessions and extension courses undermined experimentation of any sort, for unlike the auto mechanics and plumbers in engineering extension courses, teachers desired exact replicas of the universities' regular course offerings.

PROPRIETARY SCHOOLS AND VOCATIONAL EDUCATION

The main burst of university support for popular vocational education occurred between 1900 and 1930. Throughout this period, universities focused mainly on established professions like law and on occupations that were making claims to professional status, including accounting, engineering, and teaching. With the exception of their foray into popular mechanics under the banner of engineering extension, universities usually avoided the "trades." As late as 1890, few contemporaries suspected the presence of widespread demand for vocational instruction in routine office or factory tasks. Public school educators continued to reverence manual training, which studiously distanced itself from mere trade training. Traditionally, most ordinary vocational skills had been learned on the job rather than in schools, and—aside from the small number of manual

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[66] Jessie M. Pangburn, *The Evolution of the American Teachers College* (New York, Columbia University Press, 1932), p. 41.

[67] "Summer Schools; An Adverse View," *School and Society* (December 10, 1927): 733.

[68] From 78,059 in 1917/1918 to 239,570 in 1927/1928. These figures are derived from the U.S. Bureau of Education's biennial surveys of education.

[69] Alfred L. Hall-Quest, *The University Afield* (New York, Macmillan Co., 1926), pp. 125-26.

training high schools and technical institutes—few institutions of formal education addressed vocational education for the multitude.

By 1920, this situation had changed. Vocational education that embraced both the commercial and technical fields had become a crusade among public school educators and had scored a major victory with the passage, in 1917, of the Smith-Hughes Act. The relatively sudden emergence after 1900 of vocationalism in public education raises two basic questions: why did it occur at all, and how did it relate to the simultaneous development of vocational education within universities? The answer to these queries lies partly in the growth of proprietary schools in the 1880s and 1890s, for it was this growth that convinced public school educators that a mass demand existed for vocational instruction.

Correspondence Education

Proprietary law schools like Gleason Archer's struggling enterprise formed no more than the tip of an iceberg. The vast majority of the proprietary schools that sprouted in the 1880s and 1890s did not offer professional education, but they did devise innovative techniques for popular education, including instruction by mail. Appropriately, the largest of all the proprietary schools was also a pioneer in correspondence education. Originating in a column in a mining paper in Shenandoah, Pennsylvania, in the 1880s, the International Correspondence Schools of Scranton became a colossal enterprise by the early 1900s, with one hundred thousand new students enrolling each year. By 1910, the cumulative enrollments of ICS stood at one million and by 1930 at over four million.[70]

Although ICS developed courses in advertising and other commercial subjects, technical education was its forte. Unlike the engineering colleges, ICS did not claim to offer comprehensive technical instruction to individual students. Rather, ICS was conducted like a factory, specifically a factory organized along Taylorite lines. Like a Taylorite factory, with its systematic subdivision of job tasks, ICS displayed a near mania for subdividing its courses. A letter or combination of letters identified each course. The letter N, for example, signified Sanitary Plumbing and Gas-Fitting; NA, Full Mining; NB, Complete Coal Mining; NC, Metal Mining; NF, Short Coal Mining; NH, Metal Prospecting; NI, Complete Metallurgy; NJ, Hydro Metallurgy; NK, Smelting; NL, Milling; and NN,

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[70] Stuart Chase, "Job Improvement, Inc.", *Fortune* 7 (June, 1933): 66-67; J.J. Clark, "The Correspondence School—Its Relation to Technical Education and Some of Its Results," *Science*, n.s. 24 (September 14, 1906): 328.

Ocean Navigation.[71] All of this gave ICS the aspect of an educational automat: students paid their fee and consumed whatever they chose.

Specialization was not the only link between ICS and Taylorism. As David Montgomery has noted, a bias against worker autonomy permeated Taylorism. For scientific management to succeed, the control traditionally exercised by workers over the scheduling of tasks on the shop floor had to be broken. Taylor himself spoke enthusiastically of the prospect of "*enforced* standardization of methods, *enforced* adoption of the best implements and working conditions, and *enforced* cooperation of all the employees under management's detailed direction."[72]

As their application to the railroad industry illustrates, ICS's methods were highly compatible with Taylor's objectives. Among the first industries to employ salaried middle- and top-level managers, the railroads by 1860 had created organizational methods that other industries would imitate after 1870. In addition, by 1890 the subdivision of manual tasks had come to characterize routine work in the industry. J. Shirley Eaton, a leading authority on education in the industry, wrote in 1909 that "the area of skill which was formerly called a trade has been cut up into minute subdivisions, some of which can be learned in a very short time, and do not require the maturity and breadth of view in the operator which the trade as a whole required."[73] Although this subdivision of tasks could be raised as an argument against vocational education, since there was little to learn, railroads often started vocational schools and cooperated with correspondence schools such as ICS and the School of Railway Signaling in Utica. For example, railroads referred employees to correspondence courses, deducted tuition fees from paychecks, and used enrollment in correspondence courses as a basis for promotion.[74]

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[71] *The I.C.S. System of Instruction by Mail* (Scranton, International Correspondence Schools, 1905). By 1910, over two hundred proprietary correspondence schools offered instruction in an astonishing range of topics from biblical prophecy to agriculture. See Frank H. Palmer, "Correspondence Schools," *Education* 31 (September, 1910): 47-52; Lee Galloway, "Correspondence School Instruction by Non-Academic Institutions," *Annals of the American Academy of Political & Social Science* 67 (September, 1916): 202-217.

[72] Quoted in David Montgomery, "Workers' Control of Machine Production in the Nineteenth Century," in Montgomery, *Workers' Control in America: Studies in the History of Work, Technology, and Labor Struggles* (Cambridge, Mass., Harvard University Press, 1979), p. 26.

[73] J. Shirley Eaton, "Education for Efficiency in the Railroad Service," Department of the Interior, Bureau of Education, *Bulletin, 1909* no. 10 (Washington, D.C., 1909): 22.

[74] Ibid., p. 38.

Several features of correspondence schools made them attractive to employers. First, they shifted the costs of training workers from management to the workers themselves. Second, correspondence schools provided job-specific training. Eaton described correspondence school methods as "definite, specific, even arbitrary, never speculative:

> A principle is stated in no more general terms than may be necessary to embrace all its phases in the limited area of the particular course where it occurs. A special skill has been developed in opening up subjects to untrained minds by simple description, definition, and diagram. The avowed purpose is to fit the worker to a standard mold.[75]

The general superintendent of the Union Pacific Railroad praised the correspondence method on similar grounds. Describing the continuation school started by the Union Pacific in 1909, a school that employed the correspondence method, he praised the school for "teaching only that which is applicable to railroads, and particularly to the Union Pacific, using our standards, rules, and specifications."[76]

Correspondence schools provided a way to train workers that was beyond the reach of employees who were inclined to resist management's incursions into the practices of the shop. No longer did railroads or other industries have to rely on older workers to break in the younger ones, a practice that invited "soldiering," or setting the standard of work at an easily attainable level. In addition, correspondence education benefitted from its relative invisibility. During the 1880s, some railroads had started so-called apprenticeship schools—schools situated on the shop floor but expressing management's training priorities, including shorter periods of apprenticeship. These schools were open to the objection, Eaton recognized, that "the competitive earning power of the present journeymen in the trade would be jeopardized. It would be the same effect as the disorganization following on the introduction of a labor-saving machine."[77] Correspondence schools, on the other hand, did not overtly challenge the veterans' control of the shop floor. At the same time, ICS gave young workers a way to ally themselves with management and to skirt the veterans' restrictive practices. While threatening long-standing shop practices, ICS's methods could be

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[75] Ibid., p. 89.

[76] Quoted in ibid., p. 96.

[77] Ibid., p. 20.

advantageous to those young workers who perceived those practices as a bar to advancement. The primary constituency of ICS was composed of young men between the ages of 23 and 27. As Eaton noted, the interests of the older and younger workers were by no means identical; shop practices that restricted the number of apprentices and rewarded seniority also penalized youthfulness.[78]

One additional source of ICS's appeal bears noting: its attractiveness to native-born workers. As immigrant artisans, especially those from eastern and southern Europe, moved into the manual trades in the late nineteenth century, native-born workers either sought to enter non-manual trades or to upgrade their skills within manual trades. The lists of its students that ICS occasionally published showed an overwhelming predominance of English names. The list published in 1905, for example, contained only 11 Irish names out of 186 in Boston, 12 Italian or east European names out of over 1,200 in New York City, and fewer than 15 Slavic names out of just under 1,200 students in Chicago. ICS seems to have attracted primarily native-born workers who saw the need for more education but who could not afford the opportunity costs of prolonged formal schooling.[79]

Proprietary Classroom Education

Even before ICS came on the scene, proprietary schools had invaded the field of commercial education. The first private commercial schools had sprung up in the 1850s and served adult students in evening classes, but, by the 1880s, private day schools, which took students directly from secondary schools, dominated commercial education. The classroom format of these schools proved far more compatible with commercial than with technical education, mainly because commerce encompassed a far more comparable range of skills. In contrast, instruction by mail was ideally suited to the diversity of technical skills. Most private business schools could attract students by offering no more than bookkeeping, commercial arithmetic, penmanship, shorthand, and—following the successful marketing of the typewriter in the mid-1870s—typing. Between 1871 and 1892, enrollments in these schools leaped from just under 6,500 to over 90,000 students. Although most students attended during the day, the proportion of evening students rose in the

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[78] On the age of I.C.S.'s students, see *The I.C.S. System of Instruction by Mail*, preface; on shop practices, see Eaton, "Education for Efficiency in the Railroad Service," p. 21.

[79] *The I.C.S. System of Instruction by Mail.*

early 1900s until, by 1916, evening students accounted for a third of the enrollments of proprietary business schools.[80]

Although rags-to-riches themes resounded in the advertising of proprietary business schools, advertising alone did not account for their growth. Indeed, even when they did not advertise, they attracted students. For example, in the 1880s and 1890s, the Y.M.C.A. evening schools were so successful in drawing students to their commercial and technical courses, that the Association's embarrassed leaders, still wedded to the ideal of self-culture, tried to downplay the fact. Rather than advertising, it was the growing prominence of office work in the late-nineteenth-century economy that shaped demand. Office work continued to gain in importance between 1910 and 1930. The University of Chicago economist Paul Douglas estimated that the ratio of clerical workers to all workers in manufacturing dropped from one in thirteen in the decade 1890-1899 to one in seven by 1924.[81] Douglas noted that subdivision of tasks and specialization accounted for much of this change. Few manufacturers in the 1890s thought of keeping complete records of their costs; efficiency experts were only starting to grasp the complexity of calculating costs in large manufacturing enterprises. By the 1920s, however, manufacturers employed huge staffs merely to keep records. Similarly, a sales department in the 1890s typically contained a sales manager, sales personnel, and a stenographer. By the 1920s, it was unusual to find the sales department of a sizable business that did not engage in market analysis or employ complex plans to reward its salespeople for meeting quotas.[82]

Although salaried workers continued to be paid more than wage earners in manufacturing in the 1920s, the relative advantage of the salaried workers shrunk between the 1890s and the 1920s. Douglas calculated that the real earnings of wage earners in manufacturing rose 28 percent between 1890-1899 and 1924, while those of salaried workers in manufacturing rose only 2 percent.[83] This relative shrinkage of the salaried workers' advantage reflected several factors: the steady trend toward the subdivision of tasks and consequent reductions in skill levels; the movement of women

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[80] Janice Weiss, "Education for Clerical Work: The Nineteenth Century Private Commercial School," *Journal of Social History* 14 (Spring, 1981): 411.

[81] Paul H. Douglas, "What Is Happening to the White-Collar Job Market?" *System: The Magazine of Business* (December, 1926): 720-21.

[82] Ibid., p. 720.

[83] Ibid., p. 720.

into the clerical work force; and the success of the proprietary schools in matching supply to demand. To a degree, all of these factors were related. Although some of the proprietary schools called themselves colleges, their basic function was to train workers for entry-level positions. The principal change that occurred in proprietary schools between 1900 and 1925 was the rising proportion of students in their stenography courses; a federal report in 1918 did little more than compare the different types of shorthand taught by proprietary schools.[84] The prominence of stenography coincided with the rising proportion of women in proprietary schools. From a third at the start of the century, the proportion of women rose to 40-49 percent between 1910 and 1916. By 1924, there were nearly twice as many women enrolled as men.[85]

CORPORATION SCHOOLS

Whether training men or women, proprietary schools provided a narrowly vocational type of education. Indeed, narrow vocationalism was the reigning spirit of the day. It permeated commercial no less than technical education and it revealed itself in the movement for corporation schools as well as in the proprietary schools. In 1914, a number of leading businessmen established the National Association of Corporation Schools: "Everywhere," a journalist proclaimed, "there is a new alliance between education and industry and between the corporation and the community."[86]

Several motives inspired the movement for corporation schools, including the growth of corporate paternalism between 1900 and 1920. Companies with profit-sharing plans, employee health plans, and provisions for paid vacations proved especially responsive to the idea of corporation schools. But the most striking feature of these schools was their stress on the inculcation of specialized knowledge, knowledge that was company-specific as well as job-specific. Like paternalism, specialization appealed to corporate executives as a way to tie workers to their employers and reduce labor turnover. One of the pioneers of corporation schools, National Cash Register's John H. Patterson, often claimed that sales forces were made rather than born. Patterson

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[84] U.S. Department of the Interior, Bureau of Education, *Biennial Survey of Education, 1916-1918*, Bulletin, 1919 no. 91 (Washington, D.C., 1921): 416-28.

[85] Ibid., p. 389; see also J.O. Malott, "Commercial Education," U.S. Department of the Interior, Bureau of Education, *Biennial Survey of Education, 1924-1926*, Bulletin, 1928 no. 25 (Washington, D.C., 1928): 252.

[86] Donald Wilhelm, "The 'Big Business Man' as a Social Worker: A Series of Personal Portraits, III—Dr. Steinmetz of the General Electric Company," *Outlook* 108 (September-December, 1914): 499.

flatly rejected the idea that fast talkers were necessarily the best salespeople. Rather, he emphasized training salespeople to analyze a prospective client's business in order to identify the need for a cash register. One of NCR's slogans claimed that "there is in every company store a need which, when uncovered, will lead to the sale of a National cash register." Viewing effective selling as a technique that nearly anyone could master, Patterson constructed model butcher, drug, and grocery stores, complete with dummy merchandise, so that students of sales techniques could learn in realistic settings. His emphasis on specialization even followed the graduates of his schools: he refused to allow his salespeople to carry screwdrivers on their trips, lest their tinkering with broken registers distract them from selling. Instead, he established a special school for repairmen.[87]

In one respect, Patterson was a little behind the times, for by World War I many corporations had developed elaborate tests to evaluate the aptitudes of workers, thereby ensuring themselves a teachable work force. As the following sample indicates, one aptitude in demand was an ability to read quickly and to follow instructions unquestioningly:

> Do what it says as quickly as you can, but be careful to note just what it does say.
>
> With your pencil make a dot over any one of these letters—F.G.H.I.J. and a comma after the longest of these three words: boy mother girl. Then, if Christmas comes in March, make a cross right here . . . but if not, pass along to the next question, and tell where the sun rises. . . . If you believe that Edison discovered America, cross out what you just wrote, but if it was someone else, put in a number to complete this sentence. 'A horse had . . . feet.' Write, yes, no matter whether China is in Africa or not . . .; and then give a wrong answer to this question: 'How many days are there in the week?' . . . Write any letter except g just after this comma, . . . and then write no if 2 times 5 are 10 . . . . Now if Tuesday came after Monday, make two crosses here . . . , but if not, make a circle here . . . or else a square here. . . . Be sure to make three crosses between these two names of boys: George . . . Henry.[88]

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[87] Isaac Marcossen, *Wherever Men Trade: The Romance of the Cash Register* (New York, Dodd, Mead, and Co., 1948), pp. 30-39; chap. 5; see also F.C. Henderschott, "Corporation Schools," *Independent* (March 6, 1913): 519-23. Taylor, it should be noted, disapproved of Patterson's corporate paternalism, or "labor reform," and maintained that "the establishment of the semi-philanthropic schemes should follow instead of preceding the solution of the wages question"; quoted in Nelson, *Frederick W. Taylor and the Rise of Scientific Management*, p. 119.

[88] Lee Galloway, *Office Management* (New York, Ronald Press, 1918), p. 451. This test may have been an adaptation of the famous alpha series tests administered by the U.S. Army to draftees in World War I. For example, item 5 of alpha test 1 reads: "If taps sound in the evening, then put a cross in the first circle; if not, draw a line *under* the word NO." See Carl C. Brigham, *A Study of American Intelligence* (foreword by Robert M. Yerkes, Princeton, N.J., Princeton University Press, 1923), pp. 3-4.

Proprietary and corporation schools intersected vocational education in higher education at several points. The popular success of the proprietary schools helped to persuade university extension officials to experiment with vocational extension courses. In the 1890s, several universities had launched ambitious programs of off-campus lectures in fields like history, literature, and economics. The shift of universities toward vocational extension in the early 1900s reflected both the failure of extension courses in academic subjects to draw enough students and the presence of an alternative—vocationalism—whose lure had been demonstrated by the proprietary schools. University extension divisions used the courses and advertising techniques of ICS and other correspondence schools as models for their own correspondence courses.[89] In the field of law, university evening schools competed with proprietary schools for students. In some instances, universities absorbed proprietary law schools, purchasing their facilities and hiring their faculties.[90]

On balance, however, higher education ultimately was able to distinguish its version of vocationalism by emphasizing a more analytical approach than that of the proprietary schools. The inability of university extension to loosen ICS's grip on the market for popular technical instruction, the steady flow of credit-seeking schoolteachers into summer and extension courses, the development of accountancy as an academic subject, and the continuing expansion of undergraduate enrollments between 1890 and 1930—all of these factors combined to elevate university vocationalism over the proprietary variety.

Although proprietary schools failed in the long run to influence universities, both proprietary and corporation schools had a profound impact on the shape of public school vocationalism.

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[89] Reber made a study of I.C.S.'s methods, while Lighty, impersonating a prospective student, frequently wrote to proprietary correspondence schools in order to gain access to their syllabi and instructional methods. See Edward M. Hyans to Lighty, July 22, 1908, and Walton James to Lighty, December 4, 1908. Lighty Papers, University of Wisconsin. Reber's candid admission that he imitated proprietary commercial correspondence schools sparked criticism from those who saw university extension as an expression of high idealism. See Rosenstreter, *Boundaries of the Campus*, p. 69.

[90] Stevens, *Law School*, pp. 77-78.

TECHNICAL TRAINING IN THE PUBLIC SCHOOLS

Before 1900, few public school educators paid much attention to trade training, which had associations with Europe, class divisions, and social stratification. With its promise of dignifying labor, the manual training movement seemed more in tune with American ideals. Manual training, especially on the elementary school level, had the added advantage of being relatively cheap, while trade training carried several unwelcome expenses. First, trade training required many different kinds of equipment, including furnaces and engines. Although a score of trade training schools were established in the 1880s and early 1890s in or near American cities, many of these, including the New York Trade School; the Rindge School in Cambridge, Massachusetts; and the Williamson Free School of the Mechanical Trades (near Philadelphia) were endowed by philanthropists. Second, the conclusion seemed inescapable that trade training would have to take place in secondary schools, whose opportunity costs put them beyond the reach of most young people.

In contrast, between 1906 and 1917 a movement for mass trade training swept across the educational landscape of the United States. To secure support for "real" vocational education (as opposed to manual training), prominent educators allied with businessmen and reformers to found the National Society for the Promotion of Industrial Education (NSPIE) in 1906. The NSPIE, later the National Society for Vocational Education, lobbied vigorously for federal aid to education in the public schools, decisively influenced the passage of the Smith-Hughes Act, and dominated the Federal Board for Vocational Education, which administered the new law.

The NSPIE brought together strange bedfellows, including business people from the National Association of Manufacturers, settlement-house workers, principals of trade training schools, a sprinkling of labor leaders, and a dedicated core of public school educators. As befitted so diverse a membership, the NSPIE's constituents came to the organization with conflicting agendas. Labor leaders, for example, had long opposed trade training schools as schools for strikebreakers, but they had gradually warmed to the idea of vocational education as a way to keep young people off the labor market. Business leaders, concerned about America's declining international competitiveness, saw trade training as a way to enhance productivity. Some of the settlement-house workers and reformers remained attached to manual training. But for all of its diversity, the NSPIE quickly developed a clear goal: the advocacy of federal aid to vocational education conducted in separate trade schools. Its dominant motif became efficiency in education.

The direction taken by the NSPIE owed a great deal to Charles Prosser, a veteran school administrator who effectively authored the Smith-Hughes Act, and to David Snedden, a former

school superintendent who taught education at Stanford and Columbia before becoming Massachusetts's commissioner of education in 1909. Where John Dewey believed in using the practical experiences of the child as a basis for a broad comprehension of industrial processes, Prosser and Snedden championed the gospel of "social efficiency" and advocated federal aid for job-specific training conducted in separate vocational schools.

Prosser and Snedden recognized that the growth of proprietary correspondence schools revealed the failure of public education to meet a vast popular demand for trade training. The correspondence schools had made it clear that this demand was for entry-level and job-specific skills. Even the most zealous advocates of Useful Knowledge rarely had contended that schools should teach the operations of the ordinary trades. But various considerations persuaded Prosser and Snedden that schools both could and should offer such instruction. Both men saw vocational education as a way to attract native-born young people back into the manual trades and thus reduce the relative importance of immigrants in the manual labor force. Inasmuch as immigrants were often blamed for strikes and the spread of socialist ideas, the public benefits of vocational education seemed obvious to Prosser and Snedden. The very act of teaching trades in public schools would enhance the dignity of the occupations and draw native-born young people into them. The United States Commissioner of Education observed in 1916 that, for a trade to be taught in a school, it had to be reduced to principles. If there were principles to teach, then even the work of shop assistants would be elevated to the status of a skilled occupation. Vocational educators expected the schools to raise the prestige of the trades in much the same way that formal professional schooling had enhanced the status of the legal and medical professions.[91]

The discussions of principles raised a key issue: what principles informed ordinary trades in an age of specialization? Prosser and Snedden responded by attacking various connotations of "skill" and "principles." At times they and their followers argued that, under modern conditions, all occupations were becoming more like the professions. Meyer Bloomfield, a leader in the movement for vocational guidance in the schools, affirmed that business people were now "commercial engineers," less concerned with haggling over prices than with ensuring the swift and inexpensive flow of merchandise to consumers. Yet Prosser and Snedden also used "skill" in the

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[91] Joseph F. Kett, "The Adolescence of Vocational Education," in Harvey Kantor and David B. Tyack, eds., *Work, Youth, and Schooling: Historical Perspectives on Vocationalism in American Education* (Stanford, Stanford University Press, 1982), pp. 86-89. Harvey A. Kantor, *Learning to Earn: School, Work, and Vocational Reform in California, 1880-1930* (Madison, University of Wisconsin Press, 1988), pp. 27-30.

Taylorite sense of any body of organized knowledge, and therefore insisted that even apparently unskilled jobs called for skill. Taylor himself had made famous the example of pig-iron handlers. He conceded that pig-iron handling did not call for any skill at all, in the conventional sense. A handler merely picked up a piece of iron and carried it from one pile to another. According to Taylor, an intelligent gorilla could perform the job as ably as a handler. Yet Taylor's own experiments at Bethlehem Steel had increased the productivity of pig-iron handlers by determining the optimum daily distribution between work and rest periods.[92]

Given their conception of skill, Prosser and Snedden naturally gravitated to a type of vocational education that was both job-specific and job-based. Continuation schools, which allowed teenagers to alternate between school and work, seemed to them the ideal vehicle for their objectives. The Smith-Hughes Act stipulated that one-third of federal funds had to be allocated to continuation schools, and enrollments in continuation schools spurted under the new law. From the standpoint of Prosser and Snedden, continuation schools had many advantages. Such schools dealt directly with what most educators recognized as the critical age and economic group: those between fourteen and sixteen who could not afford the opportunity costs of full-time schooling. The continuation model also promised to blunt the impact of advocates of manual training, whom Prosser and Snedden viewed as bent on sacrificing real vocational education to airy abstractions. Students in continuation schools spent only four to eight hours a week in the classroom, the rest on the job, where they were instructed by workers. The growth of corporation schools persuaded Prosser and Snedden that business was their natural ally, just as the success of ICS demonstrated that any broadly-based program of vocational training had to reduce the opportunity costs of education.[93]

The philosophy behind the Smith-Hughes Act took shape before the United States entered World War I, but the war gave vocational educators their moment in the sun. The federal government supported a massive training program for workers in war industries. The government required precisely what the NSPIE had been advocating: programs that promised the swift training of workers for job-specific tasks. For example, during the war, Charles R. Allen, a prominent NSPIE official, supervised the training of shipyard instructors under the auspices of the Emergency

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[92] Nelson, *Frederick W. Taylor and the Rise of Scientific Management*, pp. 92-95.

[93] William O'Leary and Charles A. Prosser, "Short Unit Courses for Wage Earners and a Factory School Experiment," U.S. Department of Labor, Bureau of Labor Statistics, *Bulletin no. 159* (Washington, D.C., 1915).

Fleet Corporation of the United States Shipping Board. According to Allen, the only efficient—that is, quick—way to train workers was to entrust their education to skilled workers. To accomplish this, the worker-instructors themselves had to be taught to analyze and subdivide their jobs into multiple tasks, each of which could then be taught to new workers. The most efficient training was the most narrow. Allen thought it inadvisable to teach any worker more than necessary to accomplish the task. "Under good instructional conditions," he wrote, "the industrial instructor will not waste any time instructing a man in anything that he will not actually need to use and apply in the work for which he is being trained."[94]

Although wartime mobilization supported Prosser's conception of vocational education as based primarily in the workplace, once the war ended and the emergency passed school-based models of vocational education gradually gained ascendancy. Various factors account for this development. Despite the preoccupation of Prosser and the NSPIE with industrial education, congressional support for vocational education always had owed a great deal to agricultural interests. A representative of agricultural interests, Georgia's Hoke Smith, cosponsored both the Smith-Lever and Smith-Hughes acts. The Agricultural Extension Service, established by the Smith-Lever Act, employed male county agents, who taught farmers better ways to grow corn, and female agents, who organized "home demonstration work" in the form of canning clubs for rural girls. The same law also subsidized the 4-H program, the main rural youth organization. By 1917, courses in agriculture and home economics had made their way into rural schools, carried by the general enthusiasm for agricultural extension. The bulk of federal money allocated by the Smith-Hughes Act supported agricultural extension, and more students enrolled in home economics than in any other subject subsidized by the Act.

Passage of the Smith-Hughes Act also coincided with the surge of enrollments in public-school commercial courses, a type of vocational education congruous with classroom instruction.

COMMERCIAL EDUCATION IN THE PUBLIC SCHOOLS

When Prosser and Snedden spoke of workers, they usually meant men or boys working in factories, shipyards, construction, and similar sites characterized by the presence of heavy equipment. Both men were convinced that social stability depended on attracting native-born young people away from commercial fields and into the manual trades and indeed, the Smith-Hughes Act

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[94] Charles R. Allen, *The Instructor, The Man, and the Job: A Handbook for Instructors of Industrial and Vocational Subjects* (Philadelphia, J.B. Lippincott, 1919): pp. 11-12; 39-42.

did not support commercial education. Yet, as the proprietary business schools had demonstrated, commercial education was highly compatible with classroom instruction. Courses in stenography, typing, and bookkeeping flooded public secondary schools in the 1890s and generally proved popular among educators and parents alike. Enrollments in the commercial curricula of public high schools rose from 161,250 in 1914 to 430,975 in 1924. During the same period, enrollments in proprietary business schools declined sharply, from a peak of 336,032 in 1920 to 188,363 in 1924.[95] Public high schools were absorbing the function of entry-level commercial training that the proprietary schools had long performed.

The growth of commercial enrollments was part of the remarkable rise of the secondary school population between 1890 and 1930. While many factors contributed to this growth—including legal restrictions that tended to discourage the employment of children between fourteen and sixteen—the introduction of commercial courses played an important role. Commercial courses, in turn, reflected the growth of office work and the changing aspirations of a segment of the American working class. Paul H. Douglas noted that in the 1890s "white-collar jobs" were pretty much reserved for members of white-collar families.

> To put it more scientifically, the clerical class in America was practically a separate, non-competing group. The son or daughter of a machinist did not ordinarily become a white-collar worker, for the very good reason that a machinist was seldom able to send his children far enough through school to qualify them for any office jobs.[96]

In contrast, by the 1920s the manual worker, "with more dollars in the Saturday-night envelope," sent his children to school longer. "He saw the advantage to them in graduating into the white-collar class."[97]

The irony of this situation did not escape Douglas. The more students perceived high schools as routes into the white-collar middle class, the greater the number of would-be clerks and stenographers in commercial courses, and the more intense the competition for white-collar jobs.

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[95] Malott, "Commercial Education," pp. 252-53; A.L. Prickett, "Development of High School Commercial Curriculum and University Courses," *Accounting Review* 3 (March, 1928): 55.

[96] Douglas, "What is Happening to the White-Collar Job Market?" p. 721.

[97] Ibid.

The spread of commercial education seemed to ensure the continued shrinkage of the advantage of white-collar work over manual work.

Yet many educators took a more optimistic position. In 1926, J.O. Malott, a specialist in commercial education for the United States Department of Education and an eager supporter of commercial education in the public schools, used the growing specialization of office work as an argument in favor of greatly expanded commercial training. Malott's theme was the now-familiar one of scientific efficiency. As "work is divided into many activities," he wrote, "each person with special interests, aptitudes, and opportunities may devote his entire time to the work for which he is best fitted. Through repetition of comparatively few tasks great dexterity and skill are acquired." Malott counted it a positive advantage that the work of bookkeepers had been subdivided into several distinct occupations, including "invoice clerk, journal clerk, ledger clerk, machine bookkeeper, cashier, bookkeeper, and junior, senior, public, and certified public accountant."[98] In addition to specialization, Malott observed a tendency toward the standardization of office work across company lines. This too advanced the cause of vocational education in the public schools. The office worker in an age of standardization had "a better understanding of what he must do for an initial position or promotion. The means of transition to higher levels are clarified and made possible on the basis of certain known bodies of knowledge, skills, and traits."[99] In this way, the worker "is in a position to plan his future educational and business career with a minimum of lost time and energy." Narrow commercial education would ultimately encourage social mobility and prevent "the formation of a static society of office and store workers more or less stratified at distinct levels."[100]

In his Panglossian defense of commercial education, Malott took it for granted that workers rationally planned their careers to maximize profit and status. Nothing better illustrates the middle-class values of the vocational movement than this assumption, which ignored the roles of job security, ease of work, and proximity to family and friends in working-class occupational decisions. Malott's thinking reflected the tendency of vocational educators to model occupational training after professional education. Prosser and Charles R. Allen wrote in 1925 that: "In the professional field the advance from unorganized or pick-up training to organized instruction has already reached a

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[98] Malott, "Commercial Education," p. 257.

[99] Ibid., pp. 258-59.

[100] Ibid., p. 258.

considerable stage of development."[101] The implication was clear: it was merely a matter of time before education for ordinary occupations caught up with professional education.

Malott also assumed that high school graduates would seek opportunities for retraining as their careers progressed. Education never ended; life resembled a timetable, with periodic training and retraining opportunities. Malott's own evidence tended to conflict with this assumption, for he cited contemporary occupational surveys demonstrating that, save for executives and secretaries, there existed "very little actual advancement for office workers."[102] But he retained his faith that the development of business into a profession, evidenced by the proliferation of collegiate business schools and of licensing examinations for public accountants and real estate brokers, would create a ladder of opportunity for office workers.

Some contemporaries, to be sure, dismissed the whole idea of vocational education. In 1922, Arthur Pound contended that vocationalism was a waste of time, for most occupations no longer demanded skill.[103] John Dewey, whose conception of vocational education differed profoundly from that of Malott, Prosser, and Snedden, assailed the trend toward specialization and Snedden in particular for making industrial education rigid and brittle. Inasmuch as Dewey had become a virtual household deity among public-school educators by the 1920s, it is reasonable to ask why his antagonists had so much influence. Part of the answer lies in Dewey's strange indifference to secondary education. Between 1900 and 1930, virtually all of the important issues raised by the relations between work and education centered on high schools, institutions about which Dewey wrote next to nothing. In addition, as the success of the proprietary schools indicates, vocational education, even in its narrow forms, was very popular. Vocationalism was not imposed on American education by a Gradgrindian elite. Rather, it had deep popular roots among those who perceived it either as a way to enter the middle class or to advance within that class.

Finally, vocational education appealed even to those educators who found Prosser and Snedden's views extreme, because it promised to induce children to stay longer in school. Ironically, prolonged education as such had never been an important objective for Prosser and

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[101] Charles A. Prosser and Charles R. Allen, *Vocational Education in a Democracy* (New York, Century Co., 1925), p. 25.

[102] Malott, "Commercial Education," p. 263.

[103] Arthur Pound, *The Iron Man in Industry* (New York, Atlantic Monthly Press, 1922), p. 200.

Snedden. Obsessed with productivity and efficiency, their ideal was the continuation school, with young people alternating between school and work. But most educators of the 1920s and 1930s believed in prolonging education, which they considered morally and socially preferable to beginning work during adolescence. By drastically reducing the opportunities of young people to find jobs, the Great Depression undermined the continuation schools but left intact the ideal of prolonged education in vocational or comprehensive schools. In addition, while separate vocational schools survived the Depression, some of the forms of vocational education subsidized by the Smith-Hughes Act—notably agriculture and home economics—were easily reconciled with the comprehensive high schools favored by mainstream educators. As for commercial education, it had always been rooted in comprehensive schools rather than in separate vocational public schools. Contrary to the expectations of Prosser and Snedden, vocational education ultimately harmonized with an ideal that mainstream educators found irresistible: prolonged education (through adolescence) in comprehensive public schools.

VOCATIONAL EDUCATION IN PERSPECTIVE

Setting vocational education within a broad context, one that includes bbth universities and proprietary schools, helps us to identify several important historical patterns. First, throughout the period from 1860 to 1930 a succession of prominent educators called for a kind of vocational education that: (1) sought to teach the relationship between specific job skills and underlying sciences, or "industrial processes"; (2) aimed at preparation for a mobile career rather than mere job training; and (3) took place in full-time day institutions. In different ways Justin Morrill, Calvin Woodward, and John Dewey exemplified this approach. All three criticized the existing structure of work in American society and assigned vocational education the task of reforming that work structure. Morrill's land-grant graduates and Woodward's manual training graduates would restore respect for manual labor and thereby extinguish the mania for speculative profits that gripped the American middle class. Dewey's vocational pupils would grow up to become workers equipped to plan their industrial careers and resist the dehumanizing pressure of the industrial regime. All of these conceptions of vocational education were ideologically driven, in the sense that they sprang less from coherent assessments of occupational requirements than from visions of different and presumably better societies.

In relation to the manual trades, however, these expectations were never realized. The idea of comprehensive, analytical preparatory education for work took root in the elite professional schools of engineering, law, medicine, and business, but not in institutions devoted to mass vocational education. American work traditions that were established well before 1860, including

the practice of multiple occupations and admiration for the jack-of-all-trades, contributed to the stillbirth of the Morrill Act's ideal. Until the late nineteenth century, virtually all American workers learned their trades on the job, by trial and error and by observing veteran hands, rather than by formal instruction. Whatever might be said against it, this system produced enough inventive, self-taught mechanics—the Isaac Singers and Thomas Edisons—to convince most Americans that anyone could learn anything under nearly any conditions. By the late nineteenth century, however, the corporate revolution and the steady growth of credentialling requirements were stimulating an expansion of formal vocational training. As the history of proprietary schools reveals, the popular demand for vocational education was tied closely to the quest for immediately marketable skills and credentials. The high opportunity costs of full-time schooling spurred a turn to part-time vocational instruction in the forms of correspondence schools, evening classes in business and law, and public continuation schools.

Starting in the 1920s and continuing into the 1930s, the model of full-time, school-based vocational training, a model whose prospects did not appear especially bright as late as 1920, began to overcome the previously dominant model embodied in evening classes and continuation and correspondence schools. Growing demand for office workers and the rise in secondary school enrollments initially propelled the change. Ironically, ideologists of vocational education had always paid more attention to industrial than to commercial education, but it was commercial enrollments that spurred the growth of vocational education in the public schools.

The Great Depression accelerated tendencies already evident in 1929. The weight of the Depression fell heavily on part-time schools of every sort, for young people unable to find work had little incentive to take part-time vocational courses. Instead, unemployed teenagers simply prolonged their full-time education. The proportion of seventeen-year-olds to graduate from high school, which as late as 1920 stood at 16.3 percent, rose to 28.8 percent in 1930 and to 49.0 percent in 1940. The full-time model of vocational education triumphed in the public schools, by incorporating the job-specific training pioneered by the proprietary schools within the setting of the comprehensive secondary school.